6. ENGINEERING SYSTEMS REQUIREMENTS

B20 EXTERIOR ENCLOSURE

SYSTEM DESCRIPTION

This system consists of the exterior shell of the facility, which includes all vertical and horizontal exterior closure such as exterior walls, exterior windows, and exterior doors. This system excludes roofing (See System B30, *Roofing*). Load bearing exterior walls will be included here, and not in System B10, *Superstructure*. Exterior structural frame elements such as columns, beams, and spandrels if provided are included in Superstructure, with only the applied exterior finishes (e.g., paint, stucco) being included here. Finishes to the inside face of walls which are not an integral part of the wall construction will be included in System C30, *Interior finishes*.

Building occupancies and classifications shall be the 2012 International Building Code (IBC), Chapter Three. Construction Types shall be determined in accordance with Chapter Five of the 2012 IBC. Assembly ratings shall be determined in accordance with Chapter Six requirements and in accordance with 2012 NFPA 101, Life Safety Code.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

The primary exterior material of the MSAU HQ-BEQ and MCESG Annex buildings shall be face brick masonry veneer to match existing adjacent structures and Quantico's Base Exterior Architecture Plan (BEAP). Details shall include but not limited to brick quoins, brick soldier courses and common bond brick patterns. Brick masonry/concrete masonry details shall be consistent with the existing adjacent buildings. A cast stone or precast concrete water table shall be provided to match existing adjacent structures.

Provide cavity wall exterior wall systems composed of the Exterior Closure and Exterior Wall Backup Construction indicated below. Thermal Insulation and Air Barrier shall be integral with wall assembly.

Provide a 10-foot minimum tall brick screen wall with CMU or other concrete/masonry backup and cast stone coping around the dumpster enclosures. Face brick and water table shall match the MSAU HQ-BEQ and MCESG Annex buildings. Provide a screen wall of like construction for the mechanical equipment enclosure having a height adequate to screen the equipment.

Compound Access Control (CAC) building exterior walls shall consist of load bearing CMU backup with brick veneer matching adjacent buildings. A cast stone or precast concrete water table shall be provided to match existing adjacent structures.

B201001 EXTERIOR CLOSURE

Provide brick veneer exterior wall closure. Provide brick in accordance with ASTM C216, Grade SW, type FBX. Provide weeps at 24" on center. Utilize BIA Technical Notes to design, detail, and construct brick masonry walls. Flashing shall be 7 ounce copper flashing with a 3 ounce bituminous coating on each side or a fiberglass fabric bonded on each side of the copper sheet. 'Flexible membrane flashing, plastic or PVC-based membrane flashing is prohibited. Provide Cast stone or precast concrete pediments, windowsills, keystones, pilasters and water-table accent panels shall be provided to match adjacent buildings. Provide cast stone trim at the perimeter of the frames of

exterior entrance doors. Split-face concrete masonry units (CMU) is not permitted. Tilt up precast panels with inset thin brick is not permitted. Entrance doors shall be provided with transoms. Brick rowlocks, brick quoining. Jack and curved arches and brick bonding patterns, including common bond brick patterns for the face brick exterior finishes shall be provided.

The MSAU HQ-BEQ building shall also incorporate into the design faux, mannerist brick inset (windows) mimicking actual windows and having over dimensions of the adjacent windows for a balanced classical facade. These faux windows are in rooms that are not required to have actual windows or windows not permitted.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

Provide Exterior Wall Construction System (back-up systems for wall veneer) shall include load bearing concrete masonry units (CMU) as described below. Walls shall comply with all DOS requirements for wall construction.

Exterior bearing walls consisting of metal studs as the primary floor or roof supporting structural element are not permitted. Pre-engineered buildings with concrete masonry unit and brick veneer exterior walls are prohibited. Tilt up panels with thin brick veneer are prohibited. Unreinforced masonry walls are prohibited for the exterior walls of all new buildings. Design, construct and reinforce exterior masonry walls to be load bearing. Non-load bearing exterior masonry walls shall be reinforced with a minimum of 0.05% vertical reinforcement with a maximum spacing of 1200 mm (48”).

Design walls to sustain both in plane (shear) and out of plane lateral loads due to wind, seismic and blast forces. Reinforce the perimeter of openings to sustain these loads as well as vertical (gravity) loads.

See E101005 Security & Vault Equipment.

Provide concrete reinforced floor, walls and roof for additional exterior wall backup construction for the Arms Room PER MCO 5530.14a, UFC 4-215-01 and AR190-11.

B201003 INSULATION & AIR BARRIERS

Provide continuous insulation, vapor retarder and air barrier to meet or exceed requirements of project's energy savings requirements.

Provide a continuous air barrier to control air leakage into, or out of, all conditioned spaces. The building envelope shall include all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, shafts, stairs and compartmentalized unconditioned portions of the facility such as garages, and negatively pressurized spaces. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

Confirm air barrier compliance with Air Barrier Performance Test in RFP Part 3 and 4.

Provide thermal envelope performance testing through infrared thermography in accordance with RFP Part 4. Coordinate thermal imaging testing with air barrier testing construction schedule.

Include written and graphic descriptions of exterior enclosure barrier materials and location within the wall as a part of the Contractor provided design analysis. These must include but not limited to wall openings, wall intersections, inside and outside corners and wall to roof connections. Identify in the analysis the continuous boundary limits of the air barrier and of the zone or zones to be field tested for building air tightness.

B201004 PARAPETS

Not Used

B201005 EXTERIOR LOUVERS & SCREENS

Provide prefinished metal exterior louvers and screens, where required, that match the finish of the window frames and detailed to integrate with the architecture of the building, as appropriate to the design of the building.

B201006 BALCONY WALLS & HANDRAILS

Not Used

B201007 EXTERIOR SOFFITS

Provide a polyurethane classically detailed cornice and soffit trim in accordance with the BEAP. Size of the cornice and soffit trim must match the scale of the overall building massing.

Provide a painted exterior cementitious board at the underside of the exterior canopies and where needed provide a vented cementitious board.

B201009 EXTERIOR PAINTING AND COATINGS

Provide field applied exterior coatings for all items that are not prefinished, and to prefinished items when required to provide a color other than a standard prefinished color. Comply with Master Painters Institute requirements for surface preparation, paint and coating selection, and paint application.

B201010 EXTERIOR JOINT SEALANTS

Provide exterior application of joint sealants to seal joints and prepare for finish material installation.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Not Used

B201012 SCREEN WALL

Provide screen walls where required to screen mechanical units, electrical substations, and Dumpster/trash receptacles. Screen walls shall be compatible with the building architecture and the screen walls shall be constructed of face brick with precast concrete copings/caps over continuous cap flashing.

Provide an aesthetically pleasing PVC-coated or galvanized chain link cover, consistent with the surrounding campus architecture, for the exterior HVAC/ELECTRICAL ENCLOSURE serving building P-545, currently located between the proposed P-707 HQ-BEQ building and existing P-545 BEQ building. The cover shall secure the equipment according to the requirements outlined in UFC 4-010-01, Standard 2, Unobstructed Space. Support the chain link cover with a galvanized framework that makes the cover walkable. Provide bolted attachments for the cover so that it may be removed and reinstalled in such manner that will allow all or portions of the mechanical equipment to be removed from overhead without damaging the cover. Secure surfaces that can be opened to prevent unauthorized access. Provide sufficient clearance from the equipment to the underside of

the cover based on manufacturer's recommendations for operation, maintenance, and air flow. Openings in screening materials shall not exceed the requirements in UFC 4-010-01 and shall allow for air flow to the enclosed equipment per the manufacturer's specifications. Drawings for the existing enclosure are included in Part 6 of this RFP.

B2020 EXTERIOR WINDOWS

As much as practical, windows shall be provided in each area of the building that is regularly occupied, to enhance the working environment, without compromising visual acuity and comfort. Natural daylighting is preferred. Exterior windows shall be prefinished aluminum. Windows shall have thermally broken window frames and are attached to galvanized steel angles anchored directly to CMU backup wall to accept blast/wind loading – CMU jambs are to be reinforced and grouted solid. Windows shall meet Antiterrorism requirements. As a minimum, windows shall be provided in accordance with the attached architectural drawings and the BEAP. Windows shall comply with the blast requirements (UFC 4-010-01) *DoD Minimum Antiterrorism Standards for Buildings*, Mil Hdbk 1013/1A, *Design Guidance for Physical Security of Facilities*, to define window requirements.

For masonry walls, the sample window shall be installed in the masonry sample panel.

B202001 WINDOWS

Determine the construction of security windows by evaluating the project program security requirements, using the Mil Hdbk 1013/1A, *Design Guidance for Physical Security of Facilities*, to define window requirements.

Exterior windows shall be operable double hung aluminum type. Operable windows shall be provided with an integral insect screen. Provide muntins per the BEAP. Muntins shall be integrated into the insulating glass units, between the interior and exterior panes of glass. Surface applied muntins are not permitted. Window design criteria shall be in accordance with the applicable sections of the ASCE 7.

Provide energy efficient, manual operated solar shading system at all exterior windows. Provide vinyl basket-weave pattern fabric with 5% openness factor as part of the construction contract. Sleeping unit windows shall have blackout curtains (FF&E) and operable blinds (SID).

Provide a mockup of one combination window unit for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B.

B202002 STOREFRONTS

Storefronts shall have thermally broken prefinished aluminum frames. Storefront design criteria shall be in accordance with the applicable sections of the ASCE 7. Storefront shall comply with the blast requirements (UFC 4-010-01) *DoD Minimum Antiterrorism Standards for Buildings*.

B202003 CURTAIN WALLS

Not Used

B202004 EXTERIOR GLAZING

Glazing color (tint) shall match existing adjacent buildings and the glazing shall be insulating glass units, laminated glass and shall comply with the blast requirements UFC 4-010-01 *DoD Minimum Antiterrorism Standards for Buildings*. Glazing shall conform to MCB Quantico's energy conservation

requirements. Glazing shall be tinted, heat absorbing low-e, insulating/laminated glass units. Coordinate shading coefficient of glazing with the envelope and energy efficiency goals related to obtaining US Green Building Council Leadership in Energy and Environmental Design certification. All inboard lites of insulating glass units shall be clear.

The insulated glass will consist of two panes of glass separated by a dehydrated 1/2 inch airspace, filled with argon and hermetically sealed. The laminated glass will be fabricated from two nominal 1/8 inch pieces with minimum of 0.030 inch thick, clear polyvinyl butyral interlayer.

B202090 OTHER EXTERIOR WINDOWS

Not Used

B2030 EXTERIOR DOORS (hollow metal)

Provide solid door assemblies other than at the main entrance. Exterior doors and frames shall be flush type, non-corroding, insulated and factory-primed and field painted to match adjacent structures on the MCESG campus.

MSAU HQ-BEQ doors shall be Extra Heavy Duty Doors -– ANSI /SDI A250.8, Level 3. Provide Level 4 Maximum Duty doors with extra wide stiles and rails for the main vestibule doors to accommodate the DoS/OBO Embassy door hardware.

MCESG Annex doors shall be Maximum Duty Doors -– ANSI /SDI A250.8, Level 4.

Door glazing shall be ¼" laminated glass meeting the blast requirements (UFC 4-010-01) *DoD Minimum Antiterrorism Standards for Buildings.*

B203001 SOLID DOORS

Provide solid steel door assemblies other than at main entrance including factory-primed Extra-duty, non-corroding, insulated doors with frames and hardware. Also, provide louvers and accessories and wall opening elements such as lintels, sills and flashings.

B203002 GLAZED DOORS

Glazed Doors - Provide Exterior Glazed Doors and Entrances System including prefinished factory-finish aluminum framed door assemblies with insulated, tinted glazing, frames, and hardware compatible with other adjacent buildings and wall opening elements such as lintels, sills, through-wall flashings, and joint sealers. See above for exterior glazing requirements.

B203004 OVERHEAD ROLL-UP AND OVERHEAD SECTIONAL DOORS

Not Used

B203006 BLAST RESISTANT DOORS

Where required provide special doors used for blast resistance per UFC 4-010-01 *DoD Minimum Antiterrorism Standards for Buildings.*

B203008 EXTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule.

Provide hardware keying compatible with the existing base-wide keying system. Replacement interchangeable cores shall be compatible with the Best Lock system. Coordinate all lock, panic hardware, closer, and keying requirements with the Base locksmith.

Where indicated in the Room Requirements Sheet provide Force Entry/Ballistic Rated (FEBR) door hardware complying with DOS/OBO embassy standards.

Provide a card key main entry doors, secondary entry doors and ground level stairwell egress doors. Provide a card key or keypad system for sleeping room entry doors as required by Base standards and requirements.

Door hardware finish shall be stainless steel.

Doors designated by user shall have a locking system that authenticates and provides physical access by utilizing magnetic proximity encoder from Common Access Cards (CAC). The Access Control System (ACS) shall be Federal Information Processing System (FIPS)-201 compliant. The ACS shall include, but not be limited to, CAC magnetic readers, electronic security locks, programming cable, software, mounting hardware, set of mechanical keys, and a workstation with security access management system software. The door access shall be lithium battery-powered. Special battery packs are prohibited. Locksets shall be ANSI / BHMA A156.2, Series 4000, Grade 1, cylindrical, tamper-resistant, UL-listed with 1-inch throw deadbolt, 3/4-inch throw latch bolt, auxiliary dead-locking latch, and 2-3/4 inch backset.

--End of Section--